Natural Heritage &
Endangered Species
Program

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Natural Community Fact Sheet
Pitch Pine/Scrub Oak Communities

Description
Pitch pine/scrub oak communities are an open shrubland plant community that occurs on outwash sandplains. These communities, also called pine barrens, typically have an open canopy of pitch pine and an often dense understory of scrub oaks up to 2-3 meters (7-10 feet) tall and shorter huckleberry about a meter (3 feet) tall. There is often a mosaic of scrub oak, heaths such as huckleberry, lowbush blueberry, and bearberry, or lichen. Areas with tree oaks or many pitch or white pine trees are considered to be woodland or forest.


Spring view across scrub oak into a frost pocket. Photo: P. Swain, NHESP

Environment
Pitch pine/scrub oak communities occur on deep, coarse, well-drained sands derived from glacial outwash, in the coastal plain, the Connecticut River Valley, and other scattered areas throughout the northeast. The sands are acidic, nutrient poor and drought prone. In pitted outwash plains or rolling moraines, some low bowls, or kettles, are frost pockets and have more heath and lichen and less oak and pine. Deeper kettles that intersect the water table may have a Coastal Plain Pond.

Pitch pine/scrub oak communities are a fire maintained and fire dependent type of natural community. Species of the community tend to be adapted to occasional light fires: scrub oaks and huckleberries sprout readily from their root crowns and pitch pine has thick bark that resists fire damage and produces some cones that release their seeds only when heated by fire. Once the fire has passed these species sprout back vigorously while most types of trees don't survive the fire. Some of the herbaceous species have seeds that stay in the soil for years and germinate after light fire; the plant may be abundant for a few years after a fire before larger plants shade them out. A pulse of nutrient availability after a fire results in lush growth of the plants in the first few years, with increased variety of insects that eat the plants, and birds that eat the insects and berries of the plants. Prescribed burns that remove accumulated dead needles and leaves on a regular basis help maintain the natural community and reduce the danger from wildfires.

Pitch pine/scrub oak communities change if there is no disturbance such as fire: tree oaks and white pine grow in and take over. Open communities are part of a structural and successional continuum between oak-pine woodlands and open heathlands with no trees and many low shrubs. Some of the areas now covered by pitch pine/scrub oak may have been produced when deforestation by early settlers resulted in removal of nutrients and topsoil. However, given the prevailing dry, low nutrient soil conditions, the community type must have always been widespread. A natural fire regime of occasional large wildfires would have contributed to its maintenance in the areas with few natural fire breaks. Native Americans burned the woods to improve berry crops and hunting, and would have contributed to the size of the pitch pine/scrub oak areas.

Characteristic species of Pitch pine/Scrub oak Barrens in Massachusetts
Pitch pine/scrub oak communities are not floristically very diverse; the combination of few species plus the physical structure of the vegetation defines the natural community. The main tree species is pitch pine (*Pinus rigida*) with the shrubs scrub oak (*Quercus ilicifolia*) dominant near the coast and dwarf chinquapin oak (*Q.*

prinoides) more common inland. Huckleberry (*Gaylussacia baccata*) produces shorter patches among the scrub oaks. Lowbush blueberries (*Vaccinium angustifolium* and *V. pallidum*) form even lower patches, or grow mixed with other species. Bearberry (*Arctostaphylos uva-ursi*) and large patches of lichens, intermixed with sedges or little blue stem (*Schizachyrium scoparium*) occur in openings between the taller shrubs. A number of other species regularly occur in low numbers including cow wheat (*Melampyrum lineare*) and mayflower (*Epigaea repens*). The inland variant of scrub oak/ pitch pine communities have successional areas with trembling aspen (*Populus tremuloides*), gray birch (*Betula populifolia*), and black cherry (*Prunus serotina*).

The bird fauna is generally that of oak woodlands, however, Whip-poor-will (*Caprimulgus vociferus*) and Common Nighthawk (*Chordeiles minor*) now have larger populations in sandy openings of pine barrens than other parts of their increasingly restricted natural distributions. American Woodcock (*Philohela minor*) also use the openings. Heath hens (*Tympanuchus cupido cupido*), a now extinct subspecies of prairie chicken, were adapted to scrub oak communities: they ate scrub oak acorns and berries in the openings, and used scrub oak for cover. Exclusion of fire followed by very large, hot fires in their habitat likely contributede to their extinction.


Buck Moth (*Hemileuca maia*), female Photo by M.W. Nelson
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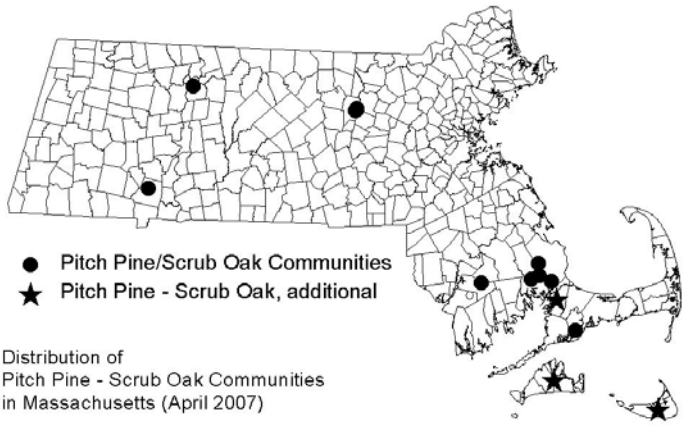
No mammalian species depend on the habitat for their existence. A variety of mice and voles use the scrub oak for cover and feed where they find acorns or berries. Larger mammals seem to prefer woodlands where they can move more easily.

Pitch pine/scrub oak barrens have a rich, specialized lepidopteran fauna. The barrens buckmoth (*Hemileuca maia*), a rare moth dependent on scrub oak is threatened throughout its northern range. A large number of other rare species of moths, particularly pitch pine and scrub oak feeders, have a strong affinity for the community type.



Distribution of
Pitch Pine - Scrub Oak Communities
in Massachusetts (April 2007)

Range

There are many acres of this natural community in southeastern Massachusetts and remnants in the Connecticut River Valley. In Southeastern Massachusetts, the large occurrences contain other community types including coastal plain ponds and pondshores, and some areas of Sandplain Heathland and Sandplain Grassland. Pitch pine did not occur on Nantucket until planted by European settlers, but scrub oak and heath species are abundant there. Martha's Vineyard has many acres of the pitch pine/ scrub oak community. Similar types of natural community occurs throughout northeastern North America. In New England there is a boreal variant north of Massachusetts, a more southern inland variant, and a coastal variant. There are also separately named types of Ridgetop Pitch Pine/Scrub Oak and Scrub Oak Shrubland Communities.

Status in Massachusetts

The community-type is severely threatened by exclusion of fire and by human development. Despite the aerial extent of the community type, the flatness of much of the terrain makes it very developable. (The soils are classified as having "excessive drainage," a term denoting difficulty in raising agricultural crops, although the native species manage quite well.) Many scrub oak/pitch pine communities occur on large aquifers, and development may threaten the quality of the water.

There are several species of butterflies and moths that depend on scrub oak/pitch pine habitats, and some of these Lepidoptera require extensive areas to have enough larval food plants or successional stages to support their

populations. The fragmentation of scrub oak/pitch pine barrens has been implicated in the extirpation of the Karner Blue butterfly (*Lycœides melissa samuelis*) from Massachusetts. Small populations of both plants and animals have reduced genetic variability, and thus reduced ability to respond to changes in the environment. Populations that are already stressed may not recover from losing a generation of adults, such as occurs after spraying for Gypsy moths or mosquitoes that reduce populations of all species of adult butterflies and moths. Although plant species tend to be better able to recover from disturbances than animal species (plant seeds may stay dormant in the soil for years and other plants can occur vegetatively in remnants), fragmentation will ultimately also reduce viability of small populations of plants.

Many acres of scrub oak/pitch pine barrens are in state and town lands, but with many competing uses of these lands, fire suppression has been almost complete, and few of the areas are managed to maintain the specific natural community type. The community would best be maintained by careful reintroduction of fire through prescribed burning or other fire management plans. Other disturbances that don't fragment the community also help maintain the natural mosaic of pitch pine/scrub oak areas.

Updated format and maps 2007, PCS-1990